

(12) **UK Patent Application** (19) **GB** (11) **2 170 943 A**

(43) Application published 13 Aug 1986

(21) Application No **8600360**

(22) Date of filing **8 Jan 1986**

(30) Priority data

(31) **8503557**

(32) **12 Feb 1985**

(33) **GB**

(51) INT CL\*

**G11B 31/00**

(52) Domestic classification (Edition H):

**G5R AC 872 873 8788 8789**

(56) Documents cited

**GB A 2160007**

**GB A 2096383**

**GB 1323858**

**GB A 2122799**

**GB A 2032677**

(58) Field of search

**G5R**

**Selected US specifications from IPC sub-class G11B**

(71) Applicant

**Music Hire Group (United Kingdom),  
Silk Mill, Low Lane, Horsforth, Leeds, West Yorkshire**

(72) Inventor

**Gordon William Todd**

(74) Agent and/or Address for Service

**Urquhart-Dykes and Lord,  
Tower House, Merrion Way, Leeds LS2 8PA, West  
Yorkshire**

(54) **Juke box**

**FIG. 1.**

(57) A juke box has a selection unit 1, a first play unit unit 3, a second play unit 4 and control means 2 responsive to the selection unit to initiate play of a selected work from the first play unit. An auxiliary control unit 6 responds to finishing of the play of the work to generate a signal for initiating play from the second play unit. The second play unit may be a second video player playing, for example, a series of advertisements, with means being provided to record the number of plays enjoyed by each advertisement. Alternatively, the second play unit may be an audio player, the auxiliary control unit operating to play special audio works during video search periods when no customer-selected audio work is playing. Operation may be controlled to provide playing of some advertisements more frequently than others. A second embodiment is detailed (Figs. 3, 4) comprising video tape deck (34), audio disc selection/playing device (35) including a set (38) of discs selectable from panel (36) and a set (39) which may or may not be so selectable.

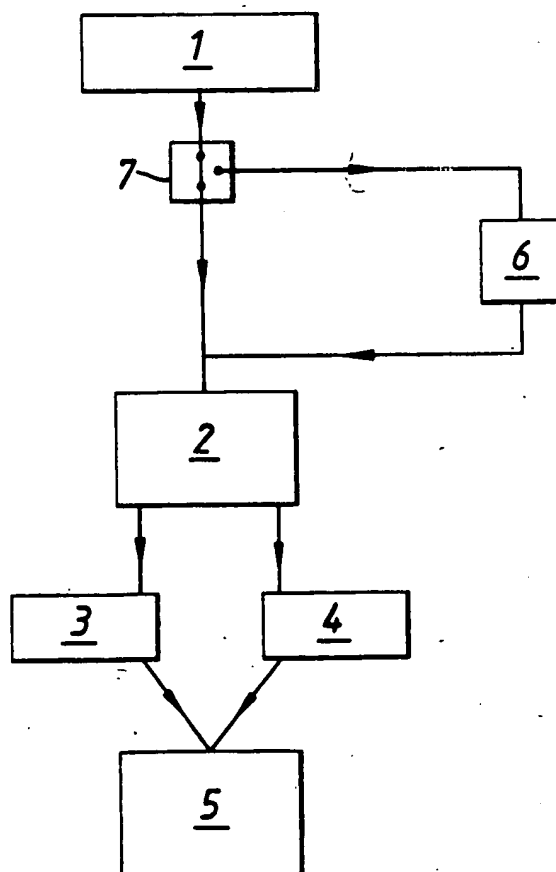
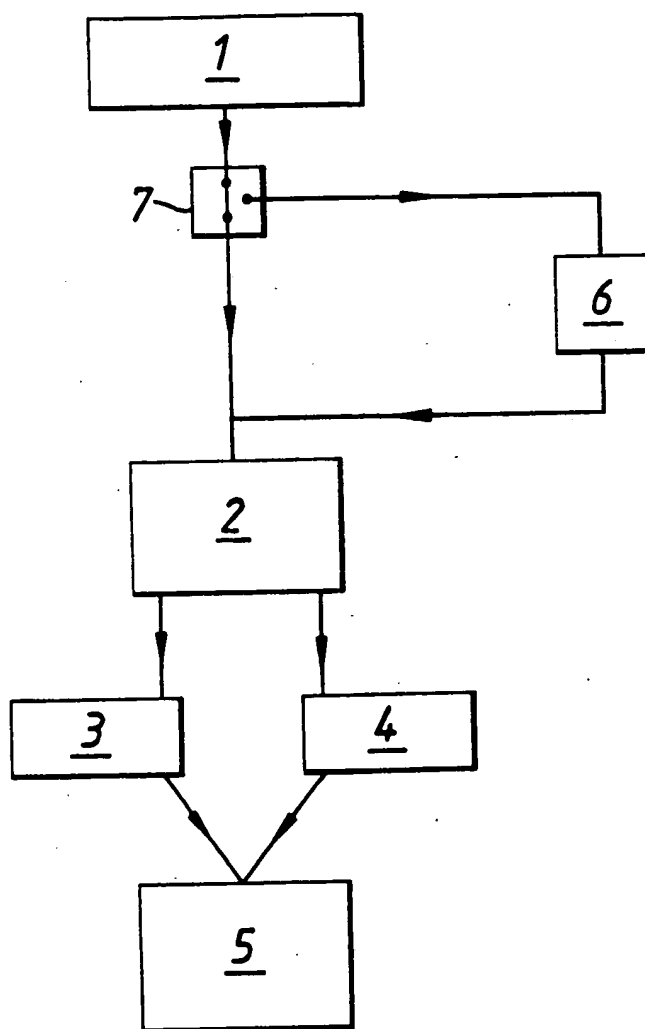


FIG. 1.



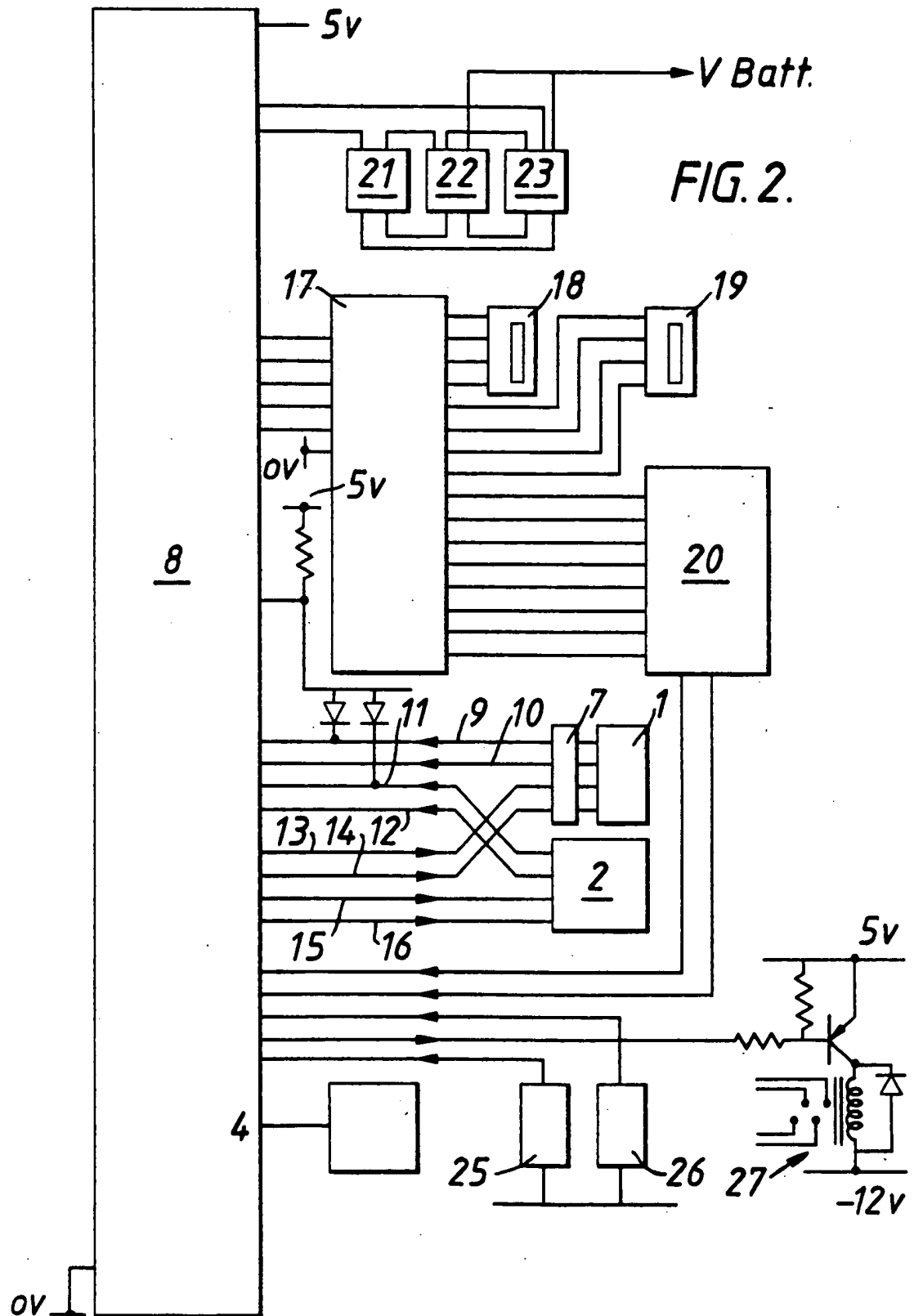


FIG. 3.

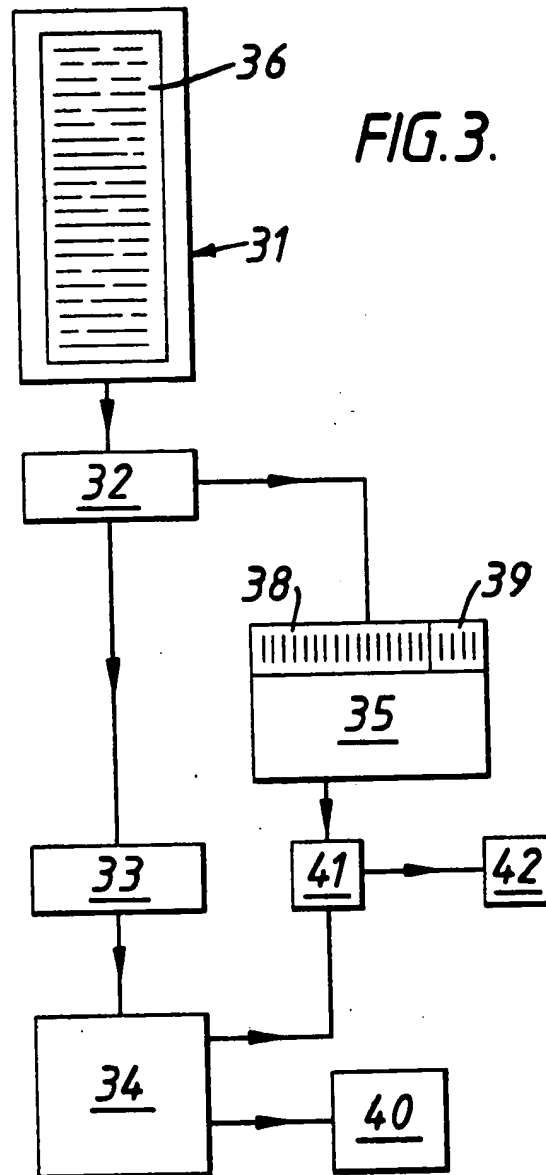
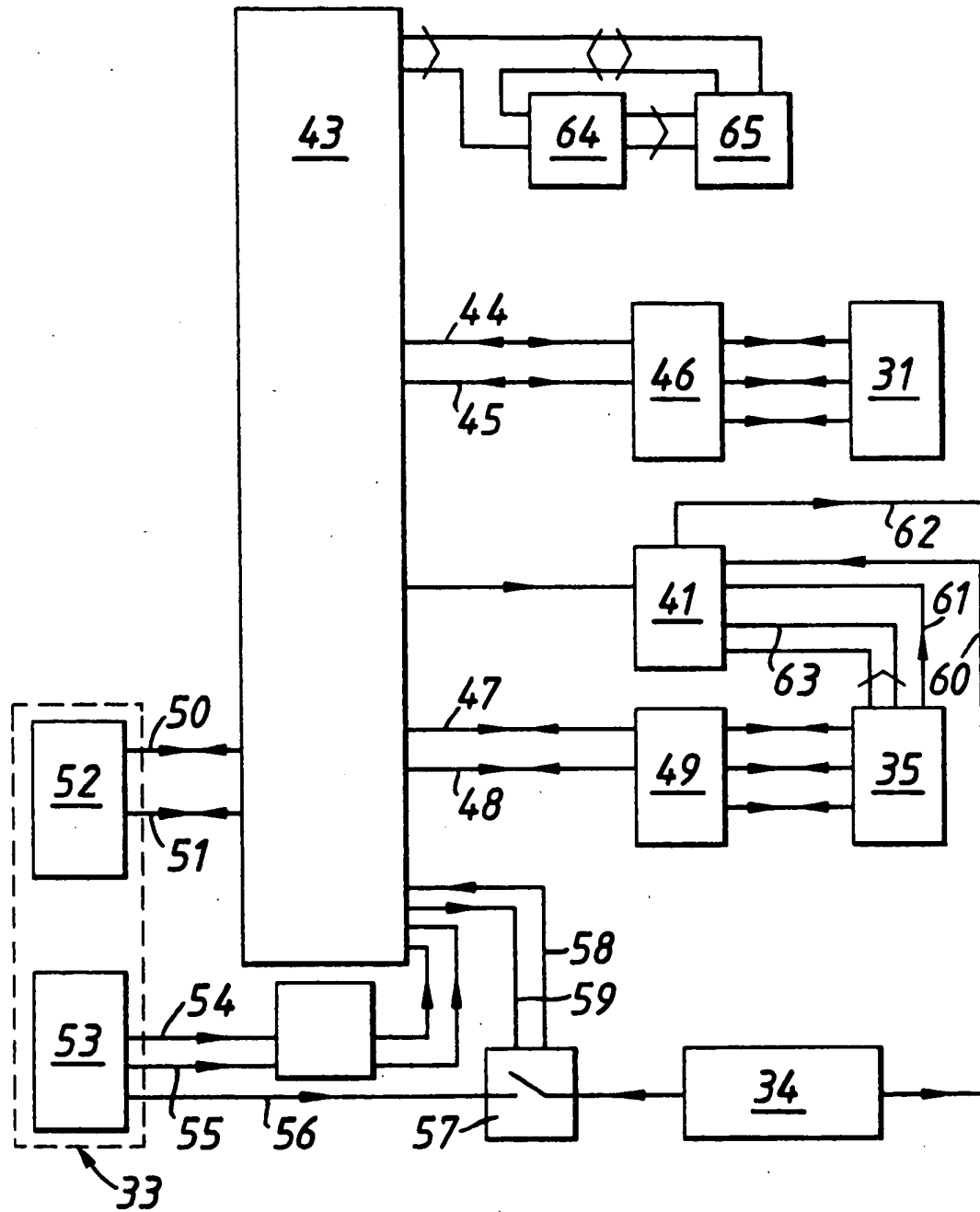


FIG. 4.



## SPECIFICATION

## Juke box

5 This invention relates to juke boxes.

The conventional juke box comprises a selection unit, a play unit and control means responsive to the selection unit to initiate play of a selected work from the play unit. The  
10 work may be an audio work recorded on disc or tape, or, more recently the work may be a video work which will usually be recorded on tape, but could alternatively be recorded on disc. The control means controls search for  
15 the required disc or for the required track from a tape or disc and presents the selected work to a playing head in order that it is transmitted to the loudspeaker and/or video monitor as appropriate.

20 It has been proposed in the context of video juke boxes that the box include two play units, each loaded with a different tape, one unit operating in response to a first set of signals from the selection unit, and the other  
25 unit operating in response to a second set of signals from the selection unit. This increases the number of works from which selection can be made. It has also been proposed that one of the two units can be searching for a selected work whilst another work is being played from the other unit in order that the  
30 amount of blank screen time is reduced.

The juke box industry is constantly seeking ways in which the versatility and appeal of their products may be increased. For example,  
35 blank screen time is a matter of concern to the industry, as it is non-revenue earning. The invention seeks to allow reduction of blank screen time by supplementing conventional  
40 plays of selected video works with other entertainment material.

According to the invention a juke box comprises a selection unit, a first play unit, a second play unit, control means responsive to the  
45 selection unit to initiate play of a selected work from the first play unit, and an auxiliary control unit responsive to finishing of the play of said work to generate a signal for initiating play from the second play unit.

50 Play from the second play unit can thus be automatic and need not be dependent on the insertion of cash into the juke box as is required for play from the first play unit. Thus, the customer may have no control over the  
55 material selected for play from the second play unit, but such play will provide entertainment in what would otherwise be blank screen time.

Juke boxes embodying the invention may be  
60 scratch built, or existing juke boxes may be modified. In the case of existing juke boxes having a single play unit, modification will entail the addition of a second play unit together with the auxiliary control unit, whereas in juke  
65 boxes already provided with two play units

the modification will be simply the addition of an auxiliary control unit. In either case the control unit may conveniently be a plug-in module which, when in operation modifies the  
70 juke box to operate in accordance with the invention, but when out of operation allows normal operation of the juke box. Such operation of the auxiliary control unit may be dependent on the engagement of plugs, or may be under the control of a switch readily accessible to the juke box maintenance firm or to the owner of the premises on which the juke box is installed.

In one embodiment of the invention it is envisaged that each play unit will be a video player. The works recorded for play by the second play unit may then generally be advertisements, the advertisers being charged for the inclusion of their advertisement on the  
80 tape or disc that is loaded into the second play unit. An important new source of revenue is thus made available to the juke box industry.

Conveniently the second play unit is loaded  
90 with a recording medium having a plurality of clips recorded thereon, and recordal means are provided for recording the number of times that each clip has been played.

In the context of advertising, each clip will be an advertisement or a block of advertisements and a record can thus be kept of the number of times that each advertisement has been played, so forming a further basis for charging to the advertiser. The recordal means  
95 may conveniently be a random access memory which will in normal operation be mains powered, although is desirably provided with a standby battery in case the mains power fails or is switched off, in order that the information stored in memory is not lost. The auxiliary control unit preferably also controls a printer which can be operated to give a print-out of the number of times that each advertisement has been played.

110 It is presently preferred that the clips be recorded in sequence on the tape or disc loaded into the second play unit and that they be played in that sequence. On initiating a play from the second unit, therefore, that unit need search only to the start of the immediately succeeding clip before play commences and blank screen time can be reduced. Frequency of play for the advertisements featured in the clip may then conveniently be controlled  
120 by effecting a return to the start of the tape or disc at predetermined times, which may be programmable as required. Thus, the advertisements at the start of the tape or disc will be played more frequently than those towards the end of the tape or disc if a return to start control signal is given at an intermediate point of the tape or disc. This is a simple method of giving advertisers a choice as to how frequently they wish their advertisement to be  
130 played, and it also provides a system whereby

the juke box may be controlled so that advertisements towards the end of the tape may be played only at selected times.

The relationship between play from the first play unit and play from the second play unit may be controlled in any one of a number of ways. As already stated, finishing of the play of a work from the first play unit generates a signal for initiating play from the second play unit. That signal may be allowed always to pass to the second play unit so that there is an enforced play from that unit before the first unit plays again. Alternatively, if while the work from the first play unit has been playing a further coin operated selection for another work from the first play unit has been made then the signal initiating play from the second play unit may be suppressed so that play is again from the first play unit. However, this method of operation may lead to considerable blank screen time, for example if the two works from the first play unit are spaced a significant distance apart on the tape or disc. The preferred method of operation, therefore, is that after a work from the first play unit has finished, a timer is operated to induce a short delay before the signal for initiating play from the second play unit is generated. On generation of that signal the second play unit searches for the start of the next clip that it is to play. The first play unit may, or may not, have simultaneously been searching for the start of a further work selected from the coin operated selection unit. If both play units are searching simultaneously then the system is such that whichever unit first reaches the start of the work for which it is searching plays that work. It will be remembered that a signal for initiating play from the second play unit is generated in response to finishing of a play from the first play unit. It is preferred, however, that such initiating signals are also generated whenever play of a work from the second play unit finishes. Thus, even during a prolonged absence of selections made from the selection unit works will be played from the second play unit separated only by very short intervals of blank screen time so minimising this time and maximising advertising revenue.

It may be felt that the frequent playing of advertisements is obtrusive, and if so the auxiliary control unit may include means for attenuating the sound level on advertisements to a level below that of normal selections, or in the case of video recorders to give vision only for works played from the second play unit.

The auxiliary control unit may conveniently be interposed between the selection unit and the control means. This is particularly desirable in the context of a juke box in which, in normal operation the selection unit generates a first set of signals for operating and selecting works from the first play unit and a second set of signals for operating and selecting

works from the second play unit. In this case one function of the auxiliary control unit may be to respond to the receipt of a signal from the second set to convert such signal to a corresponding signal from the first set so that if selection from the second play unit is made inadvertently a work is automatically played from the first play unit rather than the selection being lost. In practice, of course, when the juke box is operating in accordance with the invention the second play unit selection information which may be present on the selection unit will be blanked off so that the user is offered only the works on the first play unit.

In a second embodiment of the invention the first play unit may be a video player and the second play unit an audio player. The audio player may carry an advertisement tape that may be operated similarly to the video advertisement tape that has previously been described. Alternatively, the audio player may be a substantially conventional disc-selecting deck arrangement, and a single selection unit may be provided from which any desired mix of video and audio recordings may be selected. The selection unit will, of course, be coin operated and coin insertion may be effective to cause display of a given number of credits, the credits being reduced on given scales as selections are made, the scales usually differing for video and audio selections.

Where the selection unit includes video and audio selection means the auxiliary control unit may be responsive to finishing the play of the selected work by the video player either, if an audio work has been selected, to initiate play of that selected work by the audio player, or, if no audio work has been selected, to initiate play of a special audio work by the audio player.

A lack of entertainment during blank screen time while the video player is searching for the next track is thus avoided, either by playing a selected audio work or by filling in the search time with all or part of a specially selected work. The special works may be comprised in a second set, from which selection is made wholly under the control of the auxiliary control unit, works in the second set not being capable of selection from the selection unit. Such special works may be selected either randomly or sequentially from the second set. The works in the second set may be recorded as desired, for example they may be advertising material, they may be works chosen around a theme appropriate to the premises where the juke box is located, they may be special interest selections such as "golden oldies" or they may be preview material from works shortly to be released.

Preferably the auxiliary control unit is responsive to operation of the selection unit so that, if only video selections have been made the audio player is controlled to play a special

audio work. Entertainment is thus ensured during the search period for the first video selection.

In order to maximise the entertainment time that has actually been paid for, the auxiliary control unit may be responsive to terminate play of any special audio work on receipt of the signal from the video player that it has located the start of the selected video work to be played.

To assist in an understanding of the invention the following description of specific embodiments of juke boxes in accordance therewith will now be given, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a schematic block diagram of a first juke box embodying the invention;

Figure 2 is a block diagram of an auxiliary controller embodied in the juke box of Figure 1;

Figure 3 is a schematic block diagram of a second juke box embodying the invention; and

Figure 4 is a block diagram of an auxiliary controller embodied in the juke box of Figure 3.

Figure 1 shows a schematic diagram of a video juke box comprising a selection unit 1, a microprocessor operated controller 2, first and second video tape decks 3 and 4 and a video monitor 5. It will be understood that a number of selection units 1 may be connected in parallel to the same controller so that selections may be made from different locations within a given area. Similarly, more than one video monitor may be connected to display the output from the juke box. Each selection unit comprises a display showing the works available, each work being allocated a three figure reference number. In a normal video juke box with this type of selection unit selections numbered from 100 to 199 would be played from the first video tape deck 3, while selections numbered from 200 to 299 would be played from the second tape deck 4. The selection unit will incorporate any suitable system for entering the selected number.

The basic juke box as thus described is modified according to the invention by the interposition of an auxiliary control unit 6 between the selection unit 1 and the controller 2. The auxiliary control unit may be a simple plug-in unit or may be connected so that it may selectively be switched into operation by the switch unit 7. When the auxiliary control unit is in use that display area of the selection unit covering selections numbered from 200 to 299 will be blanked off, or will just not be present. Furthermore, the tape deck 4 will be loaded with a tape consisting of a series of advertisements, the tape being divided into a number of clips of predetermined length. Generally, each clip may be of one minute duration and may comprise either a single advertisement or a plurality of advertisements

within that time. Obviously, longer or shorter clips could be used and different clip lengths may be interspersed along the tape.

As shown in Figure 2, the auxiliary control unit 6 comprises a single chip microprocessor 8. Input lines 9 and 10 carry clock pulses and data respectively from the selection unit 1 via the switch 7, and input lines 11 and 12 carry clock pulses and data respectively from the controller 2. Output lines 13 and 14 carry clock pulses and data to the selection unit 1 via the switch 7, and output lines 15 and 16 carry clock pulses and data to the controller 2. A four-line to sixteen-line bi-directional expander port 17 is connected to the microprocessor 8 and is also connected to most significant digit and least significant digit rotary thumb wheel switches 18 and 19 and to a printer 20. The switches 18 and 19 enable a setting between 00 and 99 to be made and are used for selecting the length of tape that is played by tape deck 4 before a signal is generated causing the tape to be rewound to the beginning.

Also connected to the microprocessor 8 is a memory unit comprising an address latch 21 and two RAM chips 22 and 23. The memory unit is designed to store data indicating the number of times that each clip of the tape held in tape deck 4 has been played. The RAM chips are further connected by a line 24 to a standby battery so that the information stored therein is not lost in the event of the mains power failing or being switched off. Print and clear buttons 25 and 26 are provided. Operation of the print button causes operation of a printer mains relay unit 27 for applying mains voltage to the printer 20. It also causes the microprocessor 8 to interrogate the memory held by RAM chips 22 and 23 and feed the information to the printer to provide a printout. Operation of the clear button 26 clears and resets the memory in the chips 22 and 23.

The programmes held by the controller and the auxiliary control unit desirably control the juke box in the manner that will now be described. A customer requiring a work to be played from the tape deck 3 inserts cash into the selection unit and makes his choice by entering the number of the required selection. The selection information is directed by switch 7 to the microprocessor 8 and if the number is within the range 100 to 199 that number is passed by the microprocessor 8 to the controller 2 which causes tape deck 3 to search for the selected work and to play it in the usual way. If the customer inadvertently enters a selection number in the 200 rather than the 100 range, then the microprocessor 8 converts the 200 series number into the corresponding 100 series number and transmits the 100 series number to the controller 2 so that the tape deck 3 is operated and plays that work. Thus, the customer does not lose his



money and a work is played in response to his request.

When the work from tape deck 3 has finished playing there are two possibilities, one that a further selection request has been entered on the selection unit, and secondly that no such request has been entered. Assuming the latter circumstance, the selected work playing on tape deck 3 comes to an end, the tape is stopped and that fact is transmitted to the controller 2 and thence to the microprocessor 8. After a set time delay, which is programmable and which may for example be of the order of five seconds, the microprocessor 8 signals to the controller which in turn signals tape deck 4 that it is to search to the start of the next clip on the tape loaded on that deck and then to play that clip. This is duly done and the clip is seen on the video monitor 5. A signal indicating that play of that clip has been initiated is sent to the memory unit 21 to 23, which stores that information.

When the selected tape has finished playing on tape deck 4 a corresponding signal is sent to the controller, which signals the auxiliary controller accordingly. After the set time delay the auxiliary controller will then send a further signal to the controller 2 that initiates search for and play of the next clip in sequence on the tape mounted on the tape deck 4. The fact of this play is again recorded in the memory unit 21 to 23. Unless one of two events occurs this sequence of operations will continue, clips being played in sequence from the tape and the fact of their play being recorded in memory.

A first cause of interruption to the sequence may come from the control of the switches 18 and 19. These can be set to control the number of clips that are played from the tape on tape deck 4 before that tape is rewound to the start thereof. Thus, if the switches are set to 15 the first 15 clips will be played from the tape, which will then be rewound so that the next clip played after the fifteenth will again be the first. The switches may be changed at any required time, so that, for example, more controversial advertisements towards the end of the tape are prevented from playing on Sundays or during times when children may have access to the premises where the juke box is located. Rather than use individually settable switches a programme module may be incorporated in the unit so that control of number of the clips played at given times and on given days is automatic.

Whenever advertisements are being played under the control of the auxiliary control unit that unit also signals the selection unit to indicate that the juke box is available for play selection. Such selections are made in the usual way and selection information is transmitted through the auxiliary control unit to the controller 2 as described. Thus, when

play of a previously selected work from tape deck 3 stops, or when play of an advertisement from tape deck 4 stops, the controller may be holding information indicating that a further work is required to be played by tape deck 3. Deck 3 is thus operated to search from the start of the next work to be played therefrom, and indeed if the selection is made sufficiently early the search may have been made during play of an advertisement from deck 4. After the preset delay following play of the earlier work the auxiliary control unit 8 will signal through the controller 2 that tape deck 4 should also search to the beginning of the next clip in sequence on the tape held on that deck. Both decks may thus be searching simultaneously for their next required start point, and the logic of the controller is such that whichever deck reaches its start point first commences play of the tape held thereon. If the play is of an advertisement from deck 4 it will be seen that at the end of that play the likelihood is that the tape on deck 3 will by then be at the starting point of the next selected track and accordingly that this will be the next work that is played by the juke box. If the work played is one from tape deck 3 then the enforced delay from microprocessor 8 makes it possible for the next work played to be again from tape deck 3 if the search to that work can be completed within the delay period. If not, then the work played is an advertisement from tape deck 4.

At any required interval the memory unit 21 to 23 can be interrogated and a printout provided of the number of times that each clip has been played. This printout may form the basis of charging to the advertisers whose advertisements are contained on the tape.

The preferred logic used in the control of the juke box has been described herein, but it will be appreciated that modifications may be made thereto and that an auxiliary control unit may be programmed to control playing of an advertisement tape as required in relation to playing of works from a main tape, the number of plays of each advertisement being recorded. For example, although playing of clips in strict sequence on an advertisement tape (subject to selective rewind) is the most convenient method, it is equally possible to have controlled search to a programmed pattern of advertisements spaced along the tape. Such search may be conducted while the main tape is playing, or may be initiated when play from the main tape stops.

Referring now to Figure 3, this shows a schematic diagram of a juke box comprising a selection unit 31, a microprocessor operated controller 32, a video controller 33, a video tape deck 34 and an audio disc selection and playing device 35. The selection unit 31 is a coin operated unit that will display stored credits, and has a selection panel 36 on to which may be keyed codes for both video and

audio selections. Selections may be made in any order, and each selection will reduce the number of credits by a given amount, usually larger amount for a video selection than for an audio selection. The disc selector and player stores two sets of discs, a first set 38 which are selectable from the panel 36 of the selection unit 31, and a second set 39 which may or may not be accessible through the selection unit.

Pictures from the video player 34 are transmitted for display on one or more video monitors 40, while sound signals both from the video player 34 and from the audio player 35 pass to a relay unit 41 and thence to an amplifier and loud speaker system 42.

The auxiliary control unit 32 comprises a single chip microprocessor 43. Clock and data buses 44, 45 carry clock and data signals respectively to and from the selection unit 31 under control of a driver circuit 46. Clock and data buses 47 and 48 carry clock and data signals respectively to and from the audio player 35 under control of a drive circuit 49. Further clock and data buses 50 and 51 carry clock and data signals respectively to and from an interface card 52 comprised within the video controller 33. The controller also has a deck control card 53 capable of giving fast forward, rewind and play signals on lines 54 to 56 respectively. The play signal line 56 is connected to the player 34 through a switch 57 under the control of relay 41 and play detect signals are taken to and from the switch unit 57 on lines 58 and 59 respectively.

Sound signals are passed from the video player and the audio player respectively on lines 60 and 61 to the relay unit 41, from which sound output is taken on line 62 to the amplifier and loudspeaker unit. A cancellation signal line 63 is also provided between the relay unit 41 and the audio player 35.

The microprocessor has associated therewith an address latch 64 and a RAM chip 65.

The programmes held by the controller 33 and the auxiliary control unit 32 desirably control the juke box in a manner that will now be described. A customer requiring a work or selection of works to be played inserts cash into the selection unit and makes his choice by entering the numbers of the required selections. The selections may be any mix of video and audio works to the value of the cash inserted. The selection information is directed on data bus 45 to the microprocessor 43, is sorted and is stored in RAM chip 65. If the selection includes a record to be played from the audio player 35 then appropriate data is fed to the audio player 35 on data bus 48, the record required is selected and commences to play. Relay unit 41 responds to this action to hold open the switch 57, so preventing a play signal being passed to the video player 34.

If the whole selection to be made comprises only audio works then as one record finishes the audio player 35 is controlled to select the next record until the whole of the selected sequence has been played. If, however, the selection includes a video work then as the first selected audio work is playing, data representing the selected video work is passed by the microprocessor 43 to the video controller 33 which controls the video deck 34 to search for the starting point of the selected video work. If the video player is a tape unit this searching may take a significant period of time, although it will generally be shorter than the duration of the selected audio work. If the video player is a disc unit then searching will be very much more rapid. In either event, the video player is positioned to commence playing immediately the selected audio work finishes, and when that work has finished relay unit 41 operates to close the switch 57 so that the play signal is transmitted to the video player and the selected video work is thus played.

During play of the video work the memory 65 is interrogated and if there is a further audio work to be played then the audio player 35 is made ready accordingly. The described process is then repeated, with audio and video works being played alternately so long as this is possible. If no further video works are selected then the remaining audio works will simply be played in sequence.

There remains to be considered the case where more video works than audio works are selected, and the possibility of a selection wholly of video works. In the first instance play will alternate between audio works and video works as described until all the audio works have been played. The immediately succeeding video work will then finish and there will thus be a delay period while the video player 34 is searching for the starting point of the next selected video work. Similarly, if wholly video works have been selected there will be an initial delay period while the video deck searches for the starting point of the first selected work, and there will be similar delay periods between successive plays of video works.

Either such potential delay event is detected by the microprocessor 43, which then selects from a reserve section of RAM 65 the code for a special audio work contained in the section 39 of the audio player 35. That code is fed on data bus 48 to the audio player 35 and the special work is thus played during the video player search period. Once the starting point of the next video work has been found a signal is sent to the microprocessor 43, which sends a corresponding signal to the relay unit 41 which passes a cancellation signal on line 63 to the audio player 35. Play of the special work is then terminated and when such termination is detected at the relay unit

41, the switch unit 57 is closed so that the selected video work commences play. Again, such operations are repeated as necessary, with the selection of special works being made either randomly or sequentially from RAM 65 by the microprocessor 43.

It will be understood that there are many ways in which the auxiliary controller so described may be modified, and that control logic other than that described may be embodied therein as required.

#### CLAIMS

1. A juke box comprising a selection unit, a first play unit, a second play unit, control means responsive to the selection unit to initiate play of a selected work from the first play unit, and an auxiliary control unit responsive to finishing of the play of said work to generate a signal for initiating play from the second play unit.

2. A juke box according to claim 1 including means for selectively enabling the auxiliary control unit and second play unit.

3. A juke box according to claim 1 or claim 2 in which the auxiliary control unit is interposed between the selection unit and the control means.

4. A juke box according to any one of the preceding claims in which the first play unit is a video player and the second play unit is an audio player.

5. A juke box according to any one of claims 1 to 3 in which each play unit is a video player.

6. A juke box according to claim 5 in which the second play unit is loaded with a recording medium having a plurality of clips recorded thereon, and recordal means are provided for recording the number of times that each clip has been played.

7. A juke box according to claim 6 in which the recordal means comprises a random access memory and a printer operable to print out the memory contents.

8. A juke box according to claim 6 or claim 7 in which the recording medium is a continuous medium on to which the clips are recorded in sequence, the auxiliary control unit, on each operation, generates a signal for initiating play of the next clip in the sequence, and means are provided for returning the recording medium to the first clip play position after a preselected number of clips have been played.

9. A juke box according to any one of the preceding claims and including a timer for introducing a pre-set delay between finishing the play of said work and generating the second play initiation signal, and inhibiting means responsive to either unit commencing play to inhibit play commencing from the other unit.

10. A juke box according to claim 5, in which the selection unit includes video selection means and audio selection means, and

the auxiliary control unit is responsive to finishing the play of said selected work by the video player either if an audio work has been selected to initiate play of that selected work by the audio player or if no audio work has been selected to initiate play of a special audio work by the audio player.

11. A juke box according to claim 10 in which the audio player is capable of selection for play from two sets of audio works, a first set from which selections may be made under control from the audio selection means, and a second set from which said special audio work is selected under control from the auxiliary control unit.

12. A juke box according to claim 11 in which said special audio works are selected randomly from said second set.

13. A juke box according to claim 11 in which said special audio works are selected sequentially from said second set.

14. A juke box according to any one of claims 10 to 13 in which the auxiliary control unit is responsive to operation of the selection unit so that if only video selections have been made, the audio player is controlled to play a special audio work.

15. A juke box according to any one of the preceding claims in which the auxiliary control unit is responsive to terminate play of any special audio work on receipt of a signal from the video player that it has located the start of the selected video work to be played.

16. A juke box according to any one of the preceding claims in which the auxiliary control unit is responsive to operation of the selection unit so that a mix of video and audio selections are made to initiate play of audio and video works alternately.

17. A juke box substantially as described herein with reference to Figures 1 and 2 of the accompanying drawings.

18. A juke box substantially as described herein with reference to Figures 3 and 4 of the accompanying drawings.